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PATENT ABSTRACTS OF JAPAN

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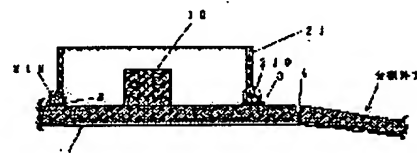
(21)Application number : 09-166110 (71)Applicant : FUJITSU TEN LTD
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(54) CAP BONDING STRUCTURE, BOARD DIVIDING METHOD AND BOARD DIVIDING STRUCTURE

(57)Abstract:

PROBLEM TO BE SOLVED: To relax the stress applied to a cap bonding part when dividing the board and eliminate leakage failure due to breakage, etc., by increasing the bonding area by increasing the bonding part thickness of a cap provided to protect an electronic component.

SOLUTION: A cap 21 has a box-shape having a hollow part entirely in the inner part. Having an electronic component 10 stored in the cap 21, adhesive 3 is applied to the four sides of the bottom plane of the cap 21, and the cap 21 is bonded and fixed to a board 1 through the adhesive 3. The parts close to the four sides of the bottom plane of the cap 21 bonded to the board 1 are permitted to be bonding parts 210, which have a taper shape that becomes thicker at the bottom, namely, a shape that permits the cap 21 to be wider on the four sides. Thus, the stress applied to the bonding part 210 of the cap 21 at the time of dividing the board 1 is relaxed and leakage failure due to breakage, etc., can be eliminated.



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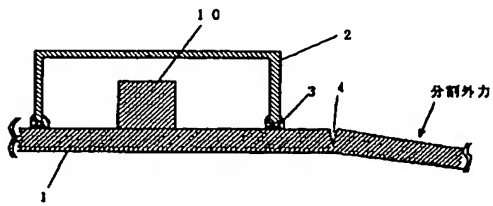
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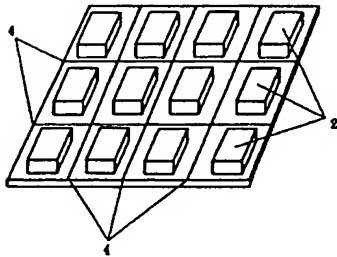
Drawing selection Drawing 9

従来のキャップ装着構造断面図と基板分割構造断面図

(a) 従来のキャップ装着構造断面図



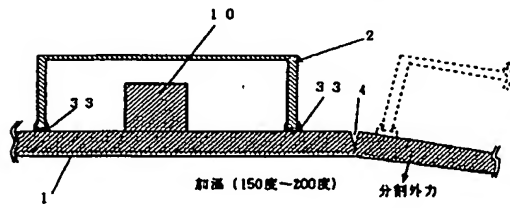
(b) 従来の基板分割構造断面図



[Translation done.]

Drawing selection Drawing 7

本発明の第7の実施例を示すキャップ接着構造断面図



[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the structure of pasting up this cap on a substrate, in the electronic instrument to which closure by the cap was given, in order to protect the electronic parts currently used for G sensor etc. from an enclosure environment (others [vibration / temperature, humidity, and]).

[0002]

[Description of the Prior Art] Drawing 9 shows the structure of pasting up the conventional cap on a substrate, (a) is a cap bonded-structure cross section, and (b) is a substrate block-construction external view. In drawing, in a substrate and 2, a cap and 3 show adhesives and 4 shows [1] the slit for a substrate split.

[0003] In the substrate 1 which consisted of two or more electronic instruments which attached the cap 2 for protecting these electronic parts 10 in the substrate 1 in which electronic parts 10 were carried through adhesives 3, this electronic instrument applies split external force through the slit for a substrate split 4, and is manufactured respectively.

[0004]

[Problem(s) to be Solved by the Invention] Although two or more electronic instruments are applying and manufacturing split external force through the substrate split slit 4 from the substrate which consisted of this plurality electronic instrument as shown in drawing 9, when superfluous stress is applied to the jointing of a cap 2 and the substrate 1 and a crack etc. arises, the poor leakage has occurred in the case of a split.

[0005] this invention makes a cap jointing ease such stress at the time of a substrate split, and aims at losing the poor leakage by the crack etc.

[0006]

[Means for Solving the Problem] In order to solve the above-mentioned purpose, it is characterized by this invention thickening thickness of the jointing with the aforementioned cap's substrate, and coming to increase adhesion area in the cap bonded structure which comes to paste [the cap for protecting these electronic parts] the substrate in which electronic parts were carried.

[0007] Moreover, it is characterized by this invention coming to form the taper which more nearly upper thickness comes it thin to carry out from this jointing to the lateral portion of the aforementioned cap corresponding to the aforementioned jointing. Moreover, this invention thickens thickness to a part for the center section of the lateral portion of the aforementioned cap corresponding to the aforementioned jointing, and it is characterized by coming to form the thickness of an upper part fraction from a part for this center section thinly.

[0008] Moreover, it is characterized by this invention coming to prepare a slit in the lateral portion of this cap corresponding to the jointing with the aforementioned cap's substrate in the cap bonded structure which comes to paste [the cap for protecting these electronic parts] the substrate in which electronic parts were carried. Moreover, it is characterized by this invention coming to prepare a hollow in the jointing with the aforementioned cap's substrate in the cap bonded structure which comes to paste [the cap for protecting these electronic parts] the substrate in which electronic parts were carried.

[0009] Moreover, it is characterized by this invention applying the adhesives with a low elastic

modulus to the superficies of the jointing with the aforementioned cap's substrate, and coming to apply the adhesives which made the bond strength increase to a internal surface of parietal bone in the cap bonded structure which comes to paste [the cap for protecting these electronic parts] the substrate in which electronic parts were carried. Moreover, this invention pastes up the cap for protecting these electronic parts on the substrate in which electronic parts were carried, and uses the thermoplastic adhesive softened with the heat of predetermined temperature for the adhesives used for the jointing with this cap's substrate, and it is characterized by performing a substrate split, where the heat of this predetermined temperature is applied.

[0010] Moreover, it is characterized by this invention coming to prepare the slit for stress absorption made shallower than the slot of the aforementioned slit for a substrate split in the aforementioned cap side from this slit for a substrate split in the substrate block construction which pastes up the cap for protecting these electronic parts on the substrate in which electronic parts were carried and which comes to form the slit for a substrate split on these outskirts of a cap of this substrate,

[0011]

[Example] Drawing 1 is a cross section of the cap bonded structure at the time of the 1st example of this invention being shown and pasting up a cap on a substrate. In addition, the same sign is attached about the same component as drawing 9 , and the explanation is omitted. In order to protect the electronic parts 10 which consist of a semiconductor sensing element like G sensor etc., on the whole, the wrap cap 21 is the core box which has a centrum inside, and is in the status store these electronic parts 10 in the centrum.

[0012] Adhesives 3 have pasted up over the aforementioned cap's 21 base four way type, and the cap 21 is being pasted up and fixed to the substrate 1 through these adhesives 3. Let the fraction near the base four way type of the cap 21 who pasted this substrate 1 be a jointing 210. This jointing 210 has the taper configuration which becomes thickness so that it approaches the base, and in this example, it is manufactured so that it may become broad over a cap four way type.

[0013] In the structure which pasted up the cap 21 on the substrate 1 with adhesives 3, it constitutes from this example so that the adhesion area in a jointing 210 may increase. Therefore, although the force which a jointing 210 makes the method of peeling from a substrate 1 to split external force occurs when dividing a substrate through the slit for a substrate split 4, since a bond strength is strong, it can follow to bending of a substrate 1, and peeling can be prevented to a jointing 210. Moreover, thickness other than jointing 210 can absorb with this the asymmetry stress to the cap 21 generated in the case of a substrate split by making it thin and making it soft.

[0014] Although drawing 2 and the drawing 3 show the 2nd of this invention, and the 3rd example, the configurations at the time of a fundamental view being the same as that of what was shown in drawing 1 , and thickening the above-mentioned thickness differ somewhat. In the case of the 2nd example, as shown in drawing 2 , a jointing 220 is formed near a cap's 22 base four way type; the thickness is made to become thin and the configuration of the lateral portion 221 corresponding to this jointing 220 is formed in the shape of [so-called] a taper so that it becomes the upper part from this jointing 220.

[0015] Moreover, a cap's 22 top section 222 is also doubled with this, and is formed thinly. In the case of the 3rd example, as shown in drawing 3 , a jointing 230 is formed near a cap's 23 base four way type, and the configuration of the lateral portion 231 corresponding to this jointing 230 2 [so-called] in which is covered from this jointing 230 by part (near the center of a base and a top) for the center section of this lateral portion, and thickness was thickly formed in, and is covered by a cap's top section 232 from a part for the center section, and thickness was formed thinly -- thickness is designed gradually

[0016] Moreover, the top section 232 is also doubled with this and is formed thinly. According to the 2nd and the 3rd example, in the structure which pasted up caps 22 and 23 on the substrate 1 with adhesives 3, as mentioned above, by constituting so that the adhesion area in jointings 220 and 230 may increase When dividing a substrate through the slit for a substrate split 4, while a bond strength is raised to split external force and peeling of jointings 220 and 230 is prevented Thickness other than a jointing 220 and 230 can absorb the asymmetry stress of the caps 22 and 23 in the case of a substrate split by making it thin and making it soft.

[0017] Drawing 4 is a cross section of the cap bonded structure at the time of the 4th example of this

invention being shown and pasting up a cap on a substrate. In addition, the same sign is attached about the same component as drawing 9 , and the explanation is omitted. In order to protect the electronic parts 10 which consist of a G sensor etc., on the whole, the wrap cap 24 is the core box which has a centrum inside, and is in the status store these electronic parts 10 in the centrum.

[0018] Adhesives 3 have pasted up over the aforementioned cap's 24 base four way type, and the cap 24 is being pasted up and fixed to the substrate 1 through these adhesives 3. Let the fraction near the base four way type of the cap 24 who pasted this substrate 1 be a jointing 240. It is the configuration in which the slit 5 was formed in the front face of a lateral portion 241 corresponding to this jointing 240 at intervals of predetermined, and when it is this example, the slit 5 is formed over the lateral portion 241 of a cap four way type.

[0019] At this example, when dividing a substrate through the slit for a substrate split 4 in the structure which pasted up the cap 24 on the substrate 1 with adhesives 3 by forming a slit in the lateral portion 241 corresponding to the jointing 240, the asymmetry stress of the cap 24 in the case of a substrate split can be absorbed by sagging this lateral portion 241. In addition, although it is made to form a slit 5 in the front face of a lateral portion 241 in this example, you may be made to form a slit 5 not only in this but in a rear-face (internal surface of parietal bone) side.

[0020] Drawing 5 is a cross section of the cap bonded structure at the time of the 5th example of this invention being shown and pasting up a cap on a substrate. In addition, the same sign is attached about the same component as drawing 9 , and the explanation is omitted. In order to protect the electronic parts 10 which consist of a G sensor etc., on the whole, the wrap cap 25 is the core box which has a centrum inside, and is taken as the status store these electronic parts 10 in the centrum.

[0021] Adhesives 3 have pasted up over the aforementioned cap's 25 base four way type, and the cap 25 is being pasted up and fixed to the substrate 1 through these adhesives 3. Let the fraction near the base four way type of the cap 25 who pasted this substrate 1 be a jointing 250. The interior of the base fraction which has countered the substrate 1 of this jointing 250 becomes depressed over the jointing 250 of a cap four way type, when the ***** half elliptical hollow 6 is formed and is this example, and 6 is formed.

[0022] In this example, in the structure which pasted up the cap 25 on the substrate 1 with adhesives 3, when the amount of adhesion to the adhesives 3 of a jointing 250 is increased and a substrate is divided through the slit for a substrate split 4 by forming a hollow in the base of a jointing 250, the asymmetry stress to the cap 25 in the case of a substrate split can be absorbed with the elasticity which adhesives 3 have.

[0023] In addition, although it becomes depressed on the base of a jointing 250 and 6 is prepared in this example, you may be made to establish a hollow in a part for the lateral portion near the base of not only this but the jointing 250 etc. Drawing 6 is a cross section of the cap bonded structure at the time of the 6th example of this invention being shown and pasting up a cap on a substrate. In addition, the same sign is attached about the same component as drawing 9 , and the explanation is omitted.

[0024] In order to protect the electronic parts 10 which consist of a G sensor etc., on the whole, the wrap cap 26 is the core box which has a centrum inside, and is in the status store these electronic parts 10 in the centrum. Adhesives have pasted up over the aforementioned cap's 26 base four way type, and the cap 26 is being pasted up and fixed to the substrate 1 through these adhesives.

[0025] Let the fraction near the base four way type of the cap 26 who pasted this substrate 1 be a jointing 260. In this example, the characteristic feature is not in this jointing 260 very thing, but the characteristic feature is in the adhesives mentioned above. That is, adhesives are formed in the internal-surface-of-parietal-bone side (that is, field side pasted up a jointing 260 and directly) of a jointing 260, are formed in the large internal-surface-of-parietal-bone adhesives [of a bond strength] 31, and superficies side (that is, field side which pastes up a jointing 260 indirectly through the aforementioned internal-surface-of-parietal-bone adhesives 31) of a jointing 260 to a substrate 1, the jointing 260, and the outside adhesives 32 mentioned later, and consist of the outside adhesives 32 with a low elastic modulus.

[0026] That is, it considers as the two-layer structure which the outside adhesives 32 pasted up so that the internal-surface-of-parietal-bone adhesives 31 might be covered, and the substrate 1 is pasted. By constituting from this example in the structure which pasted up the cap 26 on the substrate 1 with

adhesives with the powerful adhesives 31 of a bond strength, and the adhesives 32 with a low elastic modulus. When dividing a substrate through the slit for a substrate split 4, with the elasticity in which it can prevent that a jointing 260 considers as the method of peeling by the bond strength which adhesives 31 have, and adhesives 32 have it, the asymmetry stress of the cap 26 in the case of a substrate split can be absorbed, and stress can be eased.

[0027] Drawing 7 is a cross section of the cap bonded structure at the time of the 7th example of this invention being shown and pasting up a cap on a substrate. In addition, the same sign is attached about the same component as drawing 9, and the explanation is omitted. The thermoplastic adhesive softened with 150 degrees C - 200 degrees C heat is used for the adhesives 33 used for the jointing with a cap's 2 substrate 1, and where 150 degrees C - 200 degrees C heat is applied, it is made to perform a substrate split.

[0028] If technique is explained, the above-mentioned adhesives 33 are applied near the base of a cap's 2 four-way-type side face, and a cap 2 is put on a substrate 1 and it fixes to it. At this time, adhesives 33 are once hardened in ordinary temperature etc. If this is created to each electronic instrument (cap) of every and it completes, a substrate 1 will be divided along with the slit for a substrate split 4. When the environmental temperature at this time is set as the temperature which adhesives 33 soften, adhesives 33 become soft and it comes to have a springiness. Therefore, a cap's 2 asymmetry stress generated in the case of a split is absorbable for the springiness of adhesives 33. In addition, after a split is again returned to ordinary temperature, and should just harden adhesives 33.

[0029] Drawing 8 is a cross section of the cap bonded structure at the time of the example of the octavus of this invention being shown and pasting up a cap on a substrate. In addition, the same sign is attached about the same component as drawing 9, and the explanation is omitted. It is the characteristic feature to have formed the slit for stress absorption 9 which made the slot shallow inside the slit for a substrate split 4 in the example of the octavus.

[0030] Although the cap 2 is doing the square top if it sees from the substrate upper part if it explains in detail, it is trenched so that the slit for a substrate split 4 may surround the four way type with a square (refer to the drawing 9). In this example, the slit for stress absorption 9 is formed in the side near the inside 2 of the slit 4, i.e., a cap, and it is considering as the structure where it trenches so that it may surround in the same square configuration as this slit 4.

[0031] Therefore, although the force (stress) which a cap 2 makes the method of peeling from a substrate 1 in the case of a substrate split occurs, since this force is absorbed by the slit for stress absorption 9, it can prevent that a cap 2 separates. Although the example explained above should have put two or more caps on one substrate, it is good not only for this but one cap.

[0032]

[Effect of the Invention] The electronic instrument with the high reliability of work can be made, without the poor leakage by the crack etc. occurring, when the intensity of an adhesion side increases, while the stress to the cap adhesion side pasted up on the substrate which happens at the time of a substrate split is eased according to this invention, as explained above. Moreover, in a cap bonded structure not the thing to regulate in the ejection manipulation structure of the electronic instrument by split but at large [to a substrate], it is effective in preventing occurrence of the poor leakage by external force.

[Translation done.]